What is claimed is:

1. A radar apparatus comprising:

a transmitter unit which radiates a transmitter signal;

a plurality of antennas each of which receives a reflected wave produced by a reflection of said transmitter signal off an object;

a first switch unit which connects output terminals of said plurality of antennas in sequence and one at a time to an input terminal;

a downconverting unit which, by using a portion of said transmitter signal, downconverts a received signal input from said antenna connected to said input terminal of said first switch unit;

a second switch unit which connects an output of said downconverting unit to a selected one of first to nth filter circuits;

a digital signal processing unit which takes outputs of said first to nth filter circuits for input to first to nth AD converters, and which applies prescribed processing to first to nth output signals output from said first to nth AD converters and thereby detects distance or relative velocity with respect to said object; and

a signal characteristic checking unit which compares two output signals selected from among said first to nth output signals that were output based on said received signal received by a particular antenna selected from among said plurality of antennas, and thereby checks for a change in characteristics of said first to nth output signals and corrects for any difference in said characteristics.

2. A radar apparatus as claimed in claim 1, wherein said signal characteristic checking unit checks for a change in the characteristics of said first to nth output signals by comparing signal level and/or phase between said first processing signal and said second

processing signal.

3. A radar apparatus as claimed in claim 1 or 2, wherein said signal characteristic checking unit selects said particular antenna from among said plurality of antennas by controlling said first switch unit and, from said received signal received by said particular antenna, generates said first to nth output signals by controlling said second switch unit.

4. A radar apparatus as claimed in any one of claims 1 to 3, wherein when it is determined that there is a difference in said characteristics, said signal characteristic checking unit corrects for said difference in said characteristics by controlling first to nth adjusters respectively connected to inputs of said first to nth AD converters.

5. A radar apparatus as claimed in claim 4, wherein each of said first to nth adjusters includes a variable-gain amplifier and/or a variable phase shifter which are controlled by said signal characteristic checking unit.

6. A radar apparatus as claimed in claim 3, wherein, when it is determined that there is a difference in said characteristics, said signal characteristic checking unit calculates a correction value for said first to nth output signals in accordance with said difference in said characteristics, and

said digital signal processing unit corrects said first to nth output signals based on said correction value.

7. A radar apparatus as claimed in claim 6, wherein said signal characteristic checking unit stores said calculated correction value in association with said first to nth output signals, and wherein said recognition process is performed based on said first to nth output signals corrected by said correction value.

8. A radar apparatus as claimed in claim 7, wherein said signal characteristic checking unit performs

processing to check for a change in said characteristics as an initial adjustment of said apparatus and, if there is a change in said characteristics, then stores said calculated correction value in association with said first to nth output signals.

9. A radar apparatus as claimed in claim 1 or 2, wherein said signal characteristic checking unit performs processing to check for a change in said characteristics in an intermittent manner during a recognition process in which said digital signal processing unit detects the distance or relative velocity with respect to said object.

10. A radar apparatus as claimed in claim 7, wherein said signal characteristic checking unit performs processing to check for a change in said characteristics when it is recognized that said distance relative to said object remains unchanged.

11. A radar apparatus as claimed in claim 8, wherein said signal characteristic checking unit performs processing to check for a change in said characteristics when it is recognized that a vehicle equipped with said apparatus is stationary.

12. A radar apparatus as claimed in claim 1 or 2, wherein said signal characteristic checking unit performs processing to check for a change in said characteristics when the signal level and/or phase of said first to nth output signals is greater than a predetermined value or lies within a predetermined range.

13. A radar apparatus as claimed in claim 12, wherein said signal characteristic checking unit stores said calculated correction value in association with said first to nth output signals, and wherein said recognition process is performed based on said first to nth output signals corrected by said correction value.

14. A radar apparatus as claimed in claim 1 or 2, wherein said signal characteristic checking unit performs processing to check for a change in the characteristics

of said first to nth output signals in accordance with an external instruction.

15. A radar apparatus as claimed in claim 13, wherein said signal characteristic checking unit performs processing to check for a change in said characteristics as an initial adjustment of said apparatus and, if there is a change in said characteristics, then stores said calculated correction value in association with said first to nth output signals.

16. A radar apparatus as claimed in claim 1 or 2, wherein said signal characteristic checking unit produces a notification externally when it is determined that a change has occurred in said characteristics.

17. A radar apparatus as claimed in claim 16, wherein when it is determined that a change has occurred in said characteristics, if said change in said characteristics is not within a predetermined range, said signal characteristic checking unit outputs diagnostic information externally.

ABSTRACT

In an radar apparatus according to the present invention, any change detected in the characteristic of a receiver circuit is corrected during normal operation or at the time of an initial adjustment before shipment from factory and, furthermore, any change occurring in the characteristic due to aging or temperature variations in the operating environment is corrected as needed. In the radar apparatus which includes a plurality of receiver circuit systems to correspond with a plurality of receiving antennas, channel signals ch1 and ch2 having the same characteristics are generated by the switching operation of a second switch from a received channel signal received by an antenna selected by a first switch, and the thus generated signals are input to the respective receiver circuit systems. Any change in characteristic is detected by comparing signal level and phase between the channel signals converted from analog to digital. The characteristic of each receiver circuit system or the characteristic of each A-D converted output signal is corrected based on the result of the detection of each receiver circuit system.